Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
TerreStar Corporation Request for	)	WT Docket No. 16-290
Temporary Waiver of Substantial Service	)	
Requirements for 1.4 GHz Licenses	)	

To: Wireless Telecommunications Bureau

PETITION FOR RECONSIDERATION OF PHILIPS HEALTHCARE

Philips Healthcare ("Philips"), pursuant to Section 1.106 of the Commission's rules,[1] files this Petition for Reconsideration ("Petition") of the Order issued by the Chief of the Mobility Division, Wireless Telecommunications Bureau ("Bureau"), in the above-captioned proceeding[2] ("Order"). Philips has been in discussions with TerreStar dating to 2014 for the purpose of minimizing the possibility of interference to its Wireless Medical Telemetry Service ("WMTS") installations from operations planned by TerreStar on immediately adjacent spectrum. Subsequently, Philips participated with TerreStar in meetings with Commission staff in 2016 to discuss the causes and possible remedies to the interference potential, and has participated in this proceeding from its beginning.[3]

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[1] 47 C.F.R. § 1.106.
[2] Order, DA 17-995, WT Docket No. 16-290 (rel. Oct. 10, 2017).
[3] TerreStar Corporation Request for Temporary Waiver of Substantial Service Requirements (filed Aug. 12, 2016) ("TerreStar Request for Temporary Waiver" or "TerreStar's Request"). *See* Letter from Philips Healthcare dated July 21, 2016, attached to the TerreStar Request for Waiver at Exhibit A. *See also,* Letter from Philips Healthcare, WT Docket No. 16-290, dated Oct. 4, 2016; Reply Comments of Philips Healthcare, WT Docket No. 16-290, dated October 14, 2016; and Letter from Philips Healthcare to FCC Chairman Ajit Pai, filed in Docket No. 16-290, dated Aug. 21, 2017. After this proceeding was initiated, Counsel to Philips Healthcare also attended an *Ex Parte* meeting on Nov. 10, 2016, with TerreStar representatives and Commission staff,

Grant of TerreStar's Request Would Ensure that Spectrum is Quickly Put to Use to Improve Healthcare Outcomes and Directly Benefit the American People.

Philips, as well as GE Healthcare, the American Society of Healthcare Engineering of the American Hospital Association ("ASHE "), and Steward Health Care System all made submissions in this proceeding in support of TerreStar's Request. The TerreStar Request for Temporary Waiver was unopposed.

In the Order, the Bureau denied the TerreStar Request for Temporary Waiver notwithstanding TerreStar's demonstrated diligent and good faith efforts to meet the substantial service requirements applicable to its 1.4 GHz licenses and its having worked over multiple years to resolve difficult interference issues that threatened the WMTS systems that operate on the immediately adjacent spectrum.

The underlying purpose of construction requirements such as those at issue in this proceeding is to ensure that spectrum is put to use for the benefit of the American people. In the case presented, complex interference issues exist because the WMTS and TerreStar spectrum blocks are immediately adjacent. All concerned parties actively discussed the technical issues involved, came to identical conclusions, and strongly support TerreStar's Request as being the manner in which the spectrum can be put to use rapidly in the service of improving healthcare. To deny the waiver at this juncture is to oppose the underlying purpose of the construction requirements themselves and impede much-needed capabilities and improvements to wireless monitoring systems in hospitals that otherwise would be available but for the lack of spectrum.

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see Ex Parte Notice filed by Lawler, Metzger, Keeney & Logan in WT Docket 16-290, dated Nov. 15, 2016.

From Philip Healthcare's perspective and interest in this proceeding, the result of the Order is to prevent critically needed improvements and expansion of Wireless Medical Telemetry Service ("WMTS") to better care for critically ill patients. Instead of putting the subject spectrum to almost immediate use,[4] the practical effect of the Order instead is to relegate the spectrum at issue to continued vacancy for multiple more years, if not decades, before a new licensee can acquire it. Then, after years of wasting this valuable resource, the new licensee will have to start from scratch to find solutions to the difficult adjacent spectrum compatibility problems discussed at length in the record.

TerreStar worked with WMTS interests to find a solution to the complex spectrum compatibility issues that accompany this spectrum. It committed to put the spectrum to use within three years in ways that would directly benefit healthcare across the country and to provide the Commission with periodic updates of progress and compliance with mandatory benchmarks at regular intervals.

TerreStar's proposal smoothly integrates new services with the existing WMTS spectrum management approach. Under the proposal, for the first time critical patient monitoring could be provided outside of the hospital confines, such as in ambulances and patient homes. There is no doubt that bringing these new monitoring capabilities to patients is vitally important to deliver better healthcare across the country. Additional benefits would be the delivery of more and better healthcare to underserved populations and helping to contain healthcare costs.

[4] The construction requirements proposed by TerreStar were to be completed within 3 years, with mandatory reports and benchmarks throughout that period.

However, if the Order is not changed on reconsideration, the spectrum will continue to lie unused for many more years while patients are denied these and other medical benefits that otherwise can be delivered by advanced wireless monitoring

Medical Monitoring Requires Immediate Use of Additional Spectrum

Philips in its earlier participation in this proceeding set forth the need for additional spectrum at 1.4 GHz with which to meet the growing demand for more and better monitoring. Specifically, the point already has been reached that clinician requests for additional monitoring functions often cannot be accommodated. In addition, new data encryption and security requirements can only be added by cutting back current monitoring functions.

The TerreStar spectrum in particular is highly desirable to provide more and new wireless monitoring services because it is immediately adjacent to the two 1.4 GHz bands now used for WMTS. The location of this spectrum allows unique efficiencies as compared to spectrum located elsewhere. Using these bands for WMTS does not require imposition of restrictions and interference mitigation techniques at what otherwise would be band edges that would have to be protected both by WMTS and by the adjoining service provider(s).

WMTS has become an essential tool that enables health care providers to detect and respond more rapidly to patients in distress. Constant, recorded monitoring also allows detection of subtle changes in a patient's condition that otherwise would go undetected. Finally, software within WMTS systems can analyze and parse the multiple factors being monitored and alert caregivers to changing patient conditions that otherwise might not be detected.

The benefits to improved patient outcomes that WMTS brings to hospital patients, and the ready incorporation of data into patient electronic health records (EHRs) that is enabled by WMTS, have resulted in increasing demand for WMTS. With the current 1.4 GHz WMTS allocation, WMTS networks already are using the total allowable bandwidth. In some cases this leaves no capacity available to add monitored parameters in response to requests or to add new patients to the monitoring network.

The deficit in WMTS spectrum at 1.4 GHz is due to the bandwidth limits in the WMTS allocation itself, which consists of only 7.5 MHz. The result is that there is not enough spectrum bandwidth for Philips to provide the full capabilities that hospitals and medical personnel are requesting. For example, Philips bedside monitors use a 1.4 GHz WMTS wireless link. With the current spectrum limitations, the bedside monitors cannot support provision of 12-lead ECG data for more accurate medical data transmission over the WMTS network. The equipment also cannot provide printing commands and capabilities. Nor can alarm reflection and trend uploading of data be supported.[5]

The need for more 1.4 GHz WMTS spectrum has substantially increased even while discussions with TerreStar occurred. It was those discussions, and the likelihood of relief, that lead Philips Healthcare to devote resources and energy to preparing equipment and plans for expanding the capabilities of its WMTS devices so as to be able to meet the accelerated construction benchmarks that were discussed with Commission staff, including at an *ex parte* meeting on November 10, 2016, attended by Philips' counsel.

[5] For example, a bedside monitor will continue to collect and store a patient's data even if it is temporarily disconnected from the network. However, there is not sufficient spectrum bandwidth to upload this data to the Central Station when it reconnects, so the system cannot maintain a complete patient record.

Additional pressures in the limited 1.4 GHz spectrum are being felt. Within the past year, Philips has observed increasing interest in the medical community to move some WMTS systems to the 1.4 GHz WMTS band from the 608 - 614 MHz WMTS band. As the Bureau well appreciates, recent rules changes have resulted in the 608 – 614 MHz band possibly becoming less suitable for meeting some of the future's critical wireless monitoring needs.[6] Philips and other manufacturers are necessarily involved with evaluating operations in the lower band and looking at the higher band for potential relief, but in some instances there already is not enough spectrum at 1.4 GHz to support the needed functions. While the effect of the rules changes are not completely apparent yet, there is widespread concern about the future viability of that band for some of the wireless monitoring functions.

Another factor greatly affecting the capacity concerns of 1.4 GHz WMTS providers is the need to implement robust security on the wireless monitoring data streams. Digital hacking at some hospitals has raised data security concerns, and all wireless (and wired) communication must increase security through more robust encryption. WMTS systems must soon integrate "end-to-end" encryption between patient sensors (the devices worn by patients) and clinician end points where monitors display patient vitals to medical personnel and devices store the information for analysis and patient records.

In this regard, the Veterans' Administration ("VA") has adopted standards developed by the National Institute of Standards and Technology ("NIST") for use by

[6] *See* Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, Report and Order, 29 FCC Rcd 6567 (2014).

WMTS and other wireless providers within their facilities.[7] All 170 VA hospitals in the United States use WMTS systems. The integration of WMTS into VA hospitals has materially increased both survivability and the overall standard of patient care for our Nation's veterans. The impact of these data security requirements is that the spectrum needed for data roughly **doubles** in order to meet the security encryption requirements. With spectrum already exhausted at some facilities, and nearing exhaustion at others, wireless monitoring itself will have to be curtailed unless additional spectrum capacity can be obtained.

The need for encryption will be felt and implemented at all hospitals over time. In select facilities demand already outstrips available spectrum. For example, the Mayo Clinic already is at full capacity using WMTS systems. Delivering new clinical features and better encryption is hindered by the lack of spectrum. As new encryption methods are deployed, more and more facilities similarly will be constrained, even without the expected growth in the number of patients or demand for new features.

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[7] *See* U.S. Department of Commerce, Technology Administration, National Institute of Standards and Technology, Security Requirements for Cryptographic Modules, FIPS PUB 140-2, available at: https://csrc.nist.gov/csrc/media/publications/fips/140/2/final/documents/fips1402.pdf. *See also,* U.S. Department of Health and Human Services, Food and Drug Administration, Center for Devices and Radiological Health, Office of Science and Engineering Laboratories, Center for Biologics Evaluation and Research, Radio Frequency Wireless Technology in Medical Devices, Guidance for Industry and Food and Drug Adminitsration Staff, available at: https://www.fda.gov/downloads/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/ucm077272.pdf

Smart Grid and Similar Uses of Spectrum Immediately Adjacent to That Used for WMTS Pose Serious Interference Concerns

The Order takes issue with the showings that destructive interference to WMTS systems would be likely by many of the possible uses of the TerreStar spectrum, including the Smart Grid deployment that was being pursued by TerreStar.[8] This is puzzling, given that multiple presentations in the record addressed the interference potential and the need to protect critical medical monitoring systems that already are in place around the country.

As Philips stated repeatedly throughout, the Smart Grid service developed and initially being rolled out by TerreStar in the spectrum immediately adjacent to the WMTS spectrum presented a clear interfering source to WMTS systems in the area. This is true even based upon the assumption that the Smart Grid operations would have been completely compliant with the Commission's Part 27 Rules, and WMTS operations are completely compliant with the Commission's Part 95 Rules.

WMTS systems operate using extremely low powers, and therefore the receivers must be extremely sensitive to receive the signals. In Philip's expert engineering opinion, there is no doubt but that Smart Grid **and many other similarly-configured commercial operations** would present unacceptable potential for destructive interference to its WMTS systems deployed at thousands of hospitals.

Philips and other WMTS interests proceeded to discuss the threatened interference with TerreStar, and while not easy, the talks resulted in a common understanding of the problem and an agreement on how to avoid the interference. In Philip's opinion, TerreStar's study of the issue's complexities and engagement in the

[8] *See, e.g.,* Order at ¶ ¶ 11, 12.

multi-year collaborative effort to protect against such interference represents an example of the type of spectrum user behavior that should be lauded and one which the Commission traditionally has encouraged.

The Order denying TerreStar's Request not only removes the possibility of WMTS being able to meet current and future demands for more monitoring parameters and increased data security, but it also leaves the service vulnerable to whatever some future licensee may plan on the adjoining spectrum.

As discussed above, it certainly is not in the public interest to leave the spectrum vacant for many more years instead of allowing it to be put to use almost immediately to help meet pressing healthcare monitoring needs. Granting TerreStar's Request would serve the very purpose of the construction requirements, and this is precisely the kind of relief that should be granted.

Grant of TerreStar's Request Is Consistent with Commission Precedent and Would Serve the Public Interest

Commission rules and precedent were misapplied and not fully acknowledged in the Order. As discussed in the record and set forth in multiple Bureau orders this year alone, "Section 1.925(b)(3) of the Commission's Rules provide in pertinent part that the Commission may grant a waiver when either '[t]he underlying purpose of the rule(s) would not be served or would be frustrated by application to the instant case, and … grant of the requested waiver would be in the public interest,' or [i]n view of unique or unusual factual circumstances of the instant case, application of the rule(s) would be

burdensome or contrary to the public interest, or the applicant has no reasonable alternative."[9] This is just such a case.

Section 1.946(e) similarly allows for extensions of time when a licensee demonstrates that failure to meet the construction deadline is due to circumstances beyond its control.[10]

TerreStar, Philips Healthcare, GE Healthcare, ASHE and Steward, individually and together, have set forth the clear need for devoting additional WMTS spectrum in this proceeding. Philips Healthcare has invested resources into planning and equipment design for the express purpose of helping meet what were expected to be aggressive benchmark and construction deadlines. Indeed, Philips was eager to implement the first generation of improvements to its WMTS systems that additional spectrum would enable.

Conclusion

Clinical needs are expanding to provide more clinical data for critically ill patients. Improved monitoring enables clinicians to intervene earlier, helping to prevent more serious and costly health outcomes. At the same time, security and encrypted communication needs have become acute.

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[9] 47 C.F.R. § 1.925(b)(3). *See* AT&T Mobility Spectrum LLC, BellSouth Mobile Data, Inc., New Cingular Wireless PCS, LLC, and SBC Telecom, Inc., Petition for Limited Waiver of Interim Performance Requirement for 2.3 GHz WCS C and D Block Licenses, Order, 32 FCC Rcd 708 at 712, ¶ 10 (2017); *See also* American Samoa Telecommunications Authority Petition for Reconsideration, Request for Waiver, and Request for Extension of Time, Letter, 32 FCC Rcd 6436 (2017); The Alaska Wireless Network, LLC, Request for Waiver of Section 27.14(g), Letter, 32 FCC Rcd 4728 (2017); Maritime Communications/Land Mobile, LLC, Debtor-In-Possession, *et al*., Order, 32 FCC Rcd 3907 (2017); AST Telecom, LLC d/b/a Bluesky Request for Waiver of Interim and Final Geographic Construction Benchmarks for Lower 700 MHZ Band A and B Block Licenses WQJQ800 and WQOU674, Letter, DA 17-1083 (rel. Nov. 3, 2017).

[10] 47 C.F.R. § 1.946(e).

The technical means to meet these demands exist, but the spectrum needed is not available. These critical issues drive the need for more WMTS spectrum. Granting the TerreStar Request would make uniquely suitable spectrum available that would strengthen the healthcare telemetry systems. The result would be to bring new technologies and innovation into the healthcare wireless monitoring space to improve patient care and reduce healthcare costs.

For all of the above reasons, the Bureau should reconsider the Order and grant TerreStar's request.

Respectfully submitted,

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